To try out in today's tutorial...

A. TENT MAP

$$x_{n+1} = 1 - 2|x_n - 1/2|$$

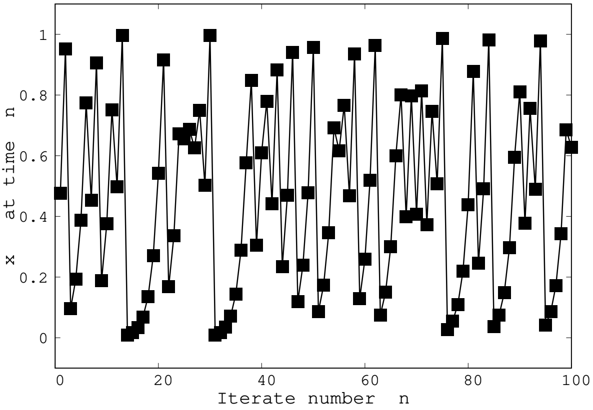
B. SHIFT MAP

$$x_{n+1} = 2x_n \mod 1$$

I. Check graphically:

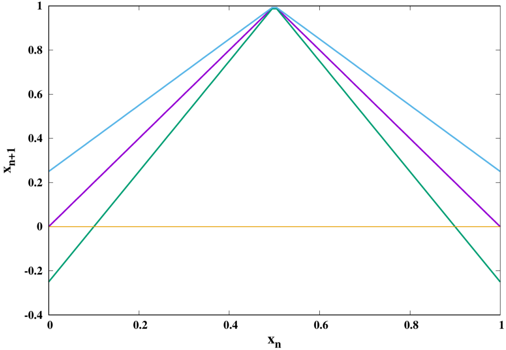
- x_{n+p} vs x_n, $p = 1, 2, 3, 4$
- Solutions for period p

II. Time series



Tips..

- In order to avoid the dynamics becoming the Bernoulli Shift, we can replace the value of 2 in the Maps with a close value that is not precisely 2 (like say, 1.9999)
- Also to avoid getting trapped in a low order periodic cycle, set the initial state x_0 to a number that is far from a rational $\frac{p}{q}$ with small p and q.
- For the Tent Map take care to see that the map stays bounded in the interval $[0:1]$, by replacing the value of 2 in the map with a real number smaller than 2



Cyan– $x_{n+1} = 1 - 1.5|x_n - 1/2|$: $0 \leq x_{n+1} \leq 1$, so iterates remain bounded in [0 : 1]

Magenta– $x_{n+1} = 1 - 2|x_n - 1/2|$: $0 \leq x_{n+1} \leq 1$, so iterates remain bounded in [0 : 1]

Green– $x_{n+1} = 1 - 2.5|x_n - 1/2|$: $x_{n+1} < 0$ in certain sub-intervals, so iterates can escape from the interval [0 : 1]